Smart Classroom

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Abstract— **This paper instantly infers the power consumption in the classrooms. The knowledge about the power wastage is used to suggest the smart classroom in which the operation of the electrical and electronic devices are automated. In this method it is first estimated what are all the devices a classroom consist (i.e.) fan, light. Some existing method had already control this kind of devices using infrared remotes. Though the infrared remotes are used, power wastage due to human negligence is possible. Hence by replacing the infrared remote with wireless sensor effective automation can be achieved in the classroom. The smart classroom system controls automatic ON/OFF of fan and light system based on the presence and absence of the human inside the room and based on the temperatures of the room. The system is developed with the help of ARDUINO board which can be used to control the speed of an electric fan based on the changes in temperature of its surrounding using Thermistor.**

In recent years, RFID technology has been widely used in various sectors, such as in-education, transportation, agriculture, animal husbandry, store sales and other sectors. RFID utilization in education is student attendance monitoring system, by using Internet of Things (IoT) and Cloud technology, it will produce a real time attendance monitoring system that can be accessed by various parties, such as lecturer, campus administration and parents. With this monitoring system if there are students who are not present can be immediately discovered and can be taken immediate action and the learning process can run smoothly

Index Terms— **Changing easy text into unintelligible text; Confidentiality; Authentication**

I. INTRODUCTION

With the help of **Power Saver System**, the power can be saved and the economy increases. The sensing of human is done with the help of magnetic switches, which is interfaced to the time delay circuit. Dawn and Dusk is detected with the help of LDR. It can be implemented in classrooms for lighting purpose. The Lights are ON as soon as students enter the cabin or classroom, this is sensed with the help of IR Tx and IR Rx. Similarly it can be employed in laboratories to make the experiment table OFF during absence of the students near the experiment table.

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One of the factor that support the success of the learning system is the presence of students during lecture, because if students are often absent then they can't understand the concept thoroughly that has been taught, so the attendance monitoring system helps to monitor the attendance of students properly. Various kinds of presences can be used from manual way to automatic way using electronic equipment, if the attendance monitoring system uses electronic equipment so the recording of attendance data becomes easier, fast and accurate. In this research, attendance monitoring system using RFID technology and with the application of Internet of Things (IoT) and cloud technology will be obtained a presence system that can run and monitored in real time, so that all parties who need information such as lecturers and parents and the administration can immediately find out if there are students who skip classroom, it can immediately be prevented so that the next meeting does not miss again.

II. METHODOLOGY

i. Lighting and Speed control of fan

Two sensors are used for the automation process. when a person crosses the PIR sensor it will sense the person, fan and light will switch on automatically as soon as the person is detected by both the sensors. Thermistor works on the common fact that as the temperature increases the output voltage across the diode increases whereas the rotational speed of fan will simultaneously increase.
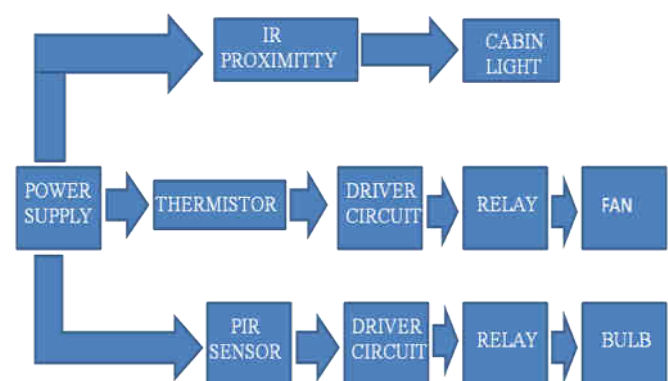

Fig 1.Block Diagram

Cabin lighting system is used to save the power in various places like office, college. With the help of IR Proximity circuit, if a person enters the room cabin lights gets ON automatically, and if he exits the lights will get turned OFF. Similarly, PIR sensor used for big halls, government offices etc. Thermistor is used for temperature sensing which is connected to driver circuit to operate the FAN. Depending on the temperature Fan speed is operated which is also called as temperature-controlled fan.

ii. Attendance monitoring technology

Radio-frequency identification (RFID) has grown rapidly in recent decades along with the demand from modern industry where data accuracy is required and efficiency improvements of a system, the supporting components of this electronic equipment are RFID reader and RFID Tags, where many kinds of tags have been manufactured according to industry needs. This technology has been applied to various sectors such as industry, airports, attendance monitoring systems, and with the use of IoT will be able to make this system more optimal.
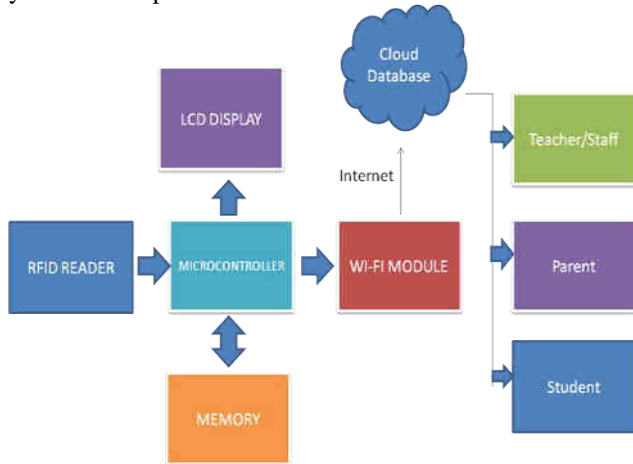
Fig 2.Block Diagram of the Attendance monitoring with RFID

Block diagram in Figure 2. Show that the process of attendance is done by using RFID technology, in this system each student has an RFID Tag to do presence, student put RFID Tag near RFID Reader, then ID result from RFID reader will be sent to microcontroller and compare it with the student data stored in memory, memory serves to store the data of the student's name of the course, if the data ID is a lecture participant then the student's name will be displayed on the LCD Display as well if the student data is not listed it will be informed through LCD Display that the student unregistered, using Wi-Fi module microcontroller can send student attendance data to cloud database by using internet network, data already accommodated in cloud database can be seen in real time by teacher, student and even parent, so that student presences can be monitored from anywhere in real time using Internet of Things (IoT).

III. HARDWARE

1. PIR SENSOR

Fig 3.PIR sensor[7]

A Passive Infrared Sensor is an electronic sensor that measures infrared(IR) light radiating from objects in its field of view. They are most often used in PIR based motion detectors. PIR is used to sense the movement of people by detecting the heat energy radiated from the body. Usually this radiation is invisible to the human eye because it radiates at infrared wavelengths, but it can be detected by electronic devices designed for such a purpose.

2. TEMPERATURE SENSOR

Fig 4.Temerature sensor (LM35)[7]

Temperature sensor is a device, typically in Arduino, LM35 temperature sensor is used for sensing Environment temperature which gives 1 degree temperature on every 10mv changes it output pin. LM35 sensor works on the basis of the common fact, as temperature increases, the voltage across a diode increases at a known rate. Based on the program, the driver circuit will rotate the fan. The room temperature will displayed using LCD.

3. LCD MODULE

Fig 5.LCD module[7]

LCD-Liquid Crystal Display is an electronic device for displaying text or references. The LCD display is interfaced with Arduino to display the count of persons and temperature values. 16x2 LCD display that means 2 rows, each of 16 characters. LCD's are economical and easily programmable and can easily display special and conventional cases. LCD makes the system user-friendly.

4. FEATURES OF ARDUINO

The operating voltage of ATMEGA 328 is 5V. The recommended input voltage is 7-12V and limited input voltage is 6-20V. There are 14 digital input output pins and 6 analog input pins. DC current per I/O pins is about 40mA, DC current for 3.3V pin is about 50mA. Flash memory is 16KB for ATMEGA168 and for ATMEGA328 is 32KB of which 2KB used by boot loader. SRAM for ATMEGA168 is 1KB and for ATMEGA328 is 2KB. EEPROM is about 512 bytes for ATMEGA168, and 1KB for ATMEGA328. The clock speed is 16MHz.

5. RELAY

Relays are electrically controlled switches. In usual type, a coil pulls in an armature when sufficient coil current flows. Relays are available for dc or ac excitation, and coil voltages from 5 volts up to 110 volts are common. The electrical relay offers a simple on / off switching action in

response to a control signal. When a current flows through the coil of wire a magnetic field is produced.

6. RFID Tags

Fig 6.RFID Tags[7]

RFID tags are a type of tracking system that uses smart barcodes in order to identify items. RFID is short for "radio frequency identification," and as such, RFID tags utilize radio frequency technology. These radio waves transmit data from the tag to a reader, which then transmits the information to an RFID computer program. RFID tags are frequently used for merchandise, but they can also be used to track vehicles, pets, and even patients with Alzheimer's disease. An RFID tag may also be called an RFID chip.

IV. RESULTS AND DISCUSSION

As per the power consumption in classroom, we came to know that with PIR we can save overall electricity cost about 86% per tube light as shown in table below.

Table 1.Result analysis

Sl no	Considerations	Without PIR	With PIR
1.	Cost of electricity per kw	5.6	5.6
2.	Operational hours of classroom tube lights	12	3
3.	Power capacity of tube light in watts	57	57
4.	Total consumption in watts	684	171
5.	Number of days	30	30
6.	Total power used by one tube light in kw	20.5	5.13
7.	Amount per month	115	29
8.	Savings per month per tube light	-	86

In this work it has been studied and implemented complete working model using micro-controller. This work induces the study of energy saving in much application. By using or implementing this we are looking for more power conversion and high security.
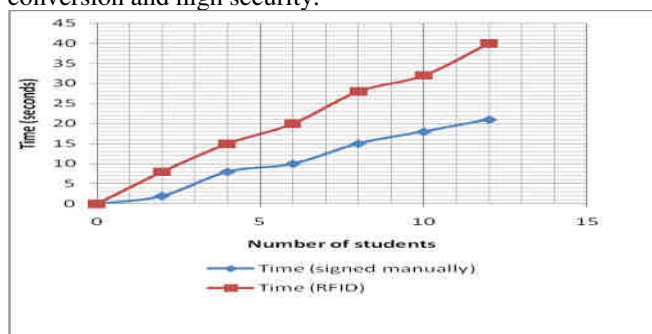

Fig 7.Comparison of time attendance.

In Fig 7, it shows the comparison between the listing attendance manually and using RFID. The fig represent that using RFID, listing the attendance of 12 students took only 20 seconds, whereas the manual method takes twice as long which is 40 s.

CONCLUSION

In this we instantly infers the power wastage in the class rooms. The knowledge derived from our estimation can enable many variable applications for social good such as effective utilization of the available power and we consider our paper as a contribution for developing smart city. Thus we address the problem by establishing a smart class room. By observing the above details, we conclude that this techniques can also be implemented at collage level, Institute level. Which we will going to design a new project that is "SMART CLASSROOM".

From the test results can be concluded that the presence by using RFID faster than the traditional way and the implementation of the Internet system of things and data storage cloud enables the system to run in real time with accurate data.

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